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TOKYO, JAPAN

July 13, 2012

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-12200

Subject: **MHI's Response to US-APWR DCD RAI No. 943-6536 Revision 0 (SRP 03.09.03)**

Reference: [1] "Request for Additional Information No. 943-6536 Revision 0, SRP Section: 03.09.03 – ASME Code Class 1, 2, and 3 Components –Application Section: 3.9.3." dated June 13 2012.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 943-6536 Revision 0 (SRP 03.09.03)".

Enclosed is the response to Question 03.09.03-30 contained within Reference 1.

Please contact Mr. Joseph Tapia, General Manager of Licensing Department, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,

Y. Ogata

Yoshiki Ogata,
Director - APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

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NRO

Enclosures:

1. Response to Request for Additional Information No. 943-6536 Revision 0 (SRP 03.09.03)

CC: J. A. Ciocco
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Enclosure 1

UAP-HF-12200
Docket No. 52-021

Response to Request for Additional Information No. 943-6536
Revision 0 (SRP 03.09.03)

July 2012

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/13/2012

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 943-6536 REVISION 0**
SRP SECTION:	**03.09.03 – ASME Code Class 1, 2, and 3 Components**
APPLICATION SECTION:	**3.9.3**
DATE OF RAI ISSUE:	**6/13/12**

QUESTION NO. RAI 03.09.03-30

10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for light Water Power Reactors." Each boiling or pressurized light-water nuclear power reactor fueled with uranium oxide pellets within cylindrical zircaloy or ZIRLO cladding must be provided with an emergency core cooling system (ECCS) that must be designed so that its calculated cooling performance following postulated loss-of-coolant accidents conforms to the criteria set forth in paragraph (b) of 10 CFR 50.46.

GSI 191 identifies the concern that debris and possible blockage of PWR sumps impact to the ECCS and recirculation flow path.

During the April 16-17 audit of MHI Recirculation Flow Path Design Change, the staff has reviewed the specification 4CS-UAP-20120006, "Basic Design Requirement and Specifications for Debris Interceptors" Rev. 0, dated 04/12/2012 depicts a transfer pipe debris interceptor. The transfer pipe opening into the containment is protected from large debris by a vertical debris interceptor.

The NRC staff requests that applicant describes the design basis, load combinations and the use of jet loads for the debris interceptor stress analysis. In addition, the applicant is requested to provide basis for the methodology and assumptions used to analyze the debris interceptor. The applicant is requested to revise the DCD to include a summary of this information.

ANSWER:

MHI submitted letter UAP-HF-12135 "Transmittal of the US-APWR DCD GSI-191 Tracking Report (May 2012 Version)" to the NRC on June 1, 2012. In this letter, MHI defined the debris interceptor as Equipment Class 2, Quality Group N/A, non-ASME equipment (See page 14/153 and 15/153 of Reference 1). The debris interceptor is non-ASME equipment because it is not a pressure retaining component. In addition, because it is not a pressure retaining component, RG 1.26 Quality Groups are not applicable. (Further details regarding equipment classification for non-pressure retaining components will be provided in the response to RAI 667-5235, Question 3.02.02-17.) However, based on MHI's procedures the

debris interceptor will be conservatively evaluated using the ASME Section III, Class 2 component stress analysis limits. The mesh structure of the debris interceptor uses ASME Code, Subsection NC, Class 2 component stress analysis limits. The remaining steel structure uses Subsection NF, Class 2 stress limits.

The load combinations shown in DCD Table 3.9-3 and Table 3.9-4 will be used for the stress analysis of the debris interceptor. Note that the latest version of the DCD Table 3.9-3 and Table 3.9-4 are shown on page 6 and 7 of MHI letter UAP-HF-12005, dated January 24, 2012.

The postulated break locations and jet sources as well as the regions affected by jet impingement are identified in accordance with the procedure described in DCD section 3.6.2.

The SG compartment debris interceptors are box-type steel mesh structures with 8 inch x 8 inch openings on the sides and a grating on top. The header compartment debris interceptors are a vertical riser-type frame with 8 inch x 8 inch mesh. For all debris interceptors, the mesh extends to a height higher than the postulated flooding level. The 8 inch x 8 inch mesh openings are sized to capture large debris that could potentially clog the overflow piping. See DCD Figure 6.2.1-14 in the May 2012 GSI-191 Tracking Report (Reference 1) for the debris interceptor schematic drawing.

Analysis of the debris interceptor is performed using elastic methods for the defined loads, including SSE and jet impingement loads. The structural qualification of the debris interceptor is performed using a combination of manual calculations and finite element analyses.

DCD section 6.2.2.3 will be revised to include this information. Refer to the attached markup for new DCD section 6.2.2.3.15.

References

1) MHI Letter No. UAP-HF-12135, “Transmittal of the US-APWR DCD GSI-191 Tracking Report (May 2012 Version)”, dated June 1, 2012.

Impact on DCD

US-APWR DCD Tier 2 Subsection 6.2.2.3 will be revised as shown on the attached markup.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

Impact on a Technical/Topical Report

There is no impact on a Technical/Topical Report.

using the rules of the ASME Boiler and Pressure Vessel Code, Class 2 Components, as presented in ASME Section III, Division 1, Subsection NC. The structural support components were evaluated as component supports per Subsection NF-3350. The Strainer Stress Report (Ref. 6.2-49) concluded that all components of the sump strainer are in compliance with the requirements of the ASME Code, 2001 edition, up to and including the 2003 Addenda (Ref. 6.2-50). DCD_06.02.02-55

6.2.2.3.15 Debris Interceptor Analysis

DCD_03.09.03-30

The US-APWR is designed with debris interceptors installed in the SG compartments and in the header compartment to prevent large debris from clogging the overflow pipes in the post-LOCA return flow path of recirculation water to the Refueling Water Storage Pit (RWSP).

The SG compartment debris interceptors are box-type steel mesh structures with 8 inch x 8 inch openings on the sides and a grating on top. The header compartment debris interceptors are a vertical riser-type frame with 8 inch x 8 inch mesh. For all debris interceptors, the mesh extends to a height higher than the postulated flooding level. The 8 inch x 8 inch mesh openings are sized to capture large debris that could potentially clog the overflow piping. See Figure 6.2.1-14 for the debris interceptor schematic drawing.

The debris Interceptor is non-ASME equipment because it is not a pressure retaining component, but is defined as Equipment Class 2 Seismic Category-I based on its safety function, as shown in Table 3.2-2. The debris interceptor will be evaluated using the applicable ASME Section III, Class 2 stress analysis limits. Mesh structure which is an element of the debris interceptor uses ASME Code, Subsection NC, Class 2 stress limit conservatively, and evaluated using load combinations that are listed in the DCD Table 3.9-3. The remaining steel structures that are considered component supports use ASME Code, Subsection NF, Class 2 stress limit, and evaluated using load combinations that are listed in the DCD Table 3.9-4.

The structural qualification of the debris interceptor is performed using a combination of manual calculations and finite element elastic analyses. The analysis is performed for the defined loads, including SSE and jet impingement loads.

6.2.2.4 Tests and Inspections

Chapter 14, Section 14.2 "Initial Plant Test Program," is organized and conducted to develop confidence that the plant operates as designed. The initial test program verifies the design and operating features, and gathers important baseline data on the nuclear steam supply system, as well as the balance-of-plant. The baseline data are used to establish the acceptability basis for surveillance and testing during the operational life of the plant. The three phases of the initial test program are as follows:

- Pre-operational tests
- Initial fuel loading and criticality
- low power and power ascension testing